5584

PROJECT SPECIFIC PLAN FOR CHARACTERIZATION OF SUBSURFACE SOILS BENEATH THE AREA 7 TRANSFER TANK AREA

SOIL AND DISPOSAL FACILITY PROJECT

FERNALD CLOSURE PROJECT
FERNALD, OHIO

JULY 2004

U.S. DEPARTMENT OF ENERGY

20500-PSP-0006
REVISION 0
FINAL

5584

PROJECT SPECIFIC PLAN FOR CHARACTERIZATION OF SUBSURFACE SOILS BENEATH THE TANK TRANSFER AREA

Document Number 20500-PSP-0006
Revision 0, Final

July 2004

APPROVAL:

7/12/04

Jyh-Dong Chiou, Project Manager
Demolition, Soils and Disposal Project
Date

7/12/04

Frank Miller, Characterization Manager
Demolition, Soils and Disposal Project
Date

Mike Ramirez / for Linda Barlow

Linda Barlow, Waste Acceptance Organization
Safety, Health and Quality
Date

7-12-04

Reinhard Friske, Quality Assurance
Demolition, Soils and Disposal Project
Date

7/12/04

Tom Buhrlage, Soil Sampling Manager
Demolition, Soils and Disposal Project
Date

FERNALD CLOSURE PROJECT

Fluor Fernald, Inc.
P.O. Box 538704
Cincinnati, Ohio 45253-8704

TABLE OF CONTENTS

APPENDIX

TABLE OF CONTENTS
(Continued)

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS
(Continued)

LIST OF ACRONYMS AND ABBREVIATIONS

ALARA	as low as reasonably achievable
ASCOC	area-specific constituent of concern
ASL	analytical support level
ccpm	corrected counts per minute
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
DOE	U.S. Department of Energy
DQO	Data Quality Objectives
ECDC	Engineering/Construction Document Control
FACTS	Fernald Analytical Computerized Tracking System
FAL	Field Activity Log
FCP	Fernald Closure Project
FRL	final remediation level
GC	gas chromatograph
GPS	global positioning system
ICP/AES	inductively coupled plasma/atomic electron spectrometry
ICP/MS	inductively coupled plasma/mass spectrometry
LAN	Local Area Network
MDC	minimum detection concentration
mg/kg	milligrams per kilogram
OSDF	On-Site Disposal Facility
PCBs	polychlorinated biphenyls
pCi/g	picoCuries per gram
ppm	parts per million
PSP	Project Specific Plan
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
SDFP	Soil and Disposal Facility Project
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
TAL	Target Analyte List
TBD	to be determined
TTA	Transfer Tank Area
V/FCN	Variance/Field Change Notice
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this project specific plan (PSP) is to provide details of the sampling to be conducted to characterize subsurface soils beneath the Transfer Tank Area (TTA). The TTA is immediately adjacent to the Silos Area. The location of the TTA is shown in Figure 1-1. The TTA facility will be one of the last structures removed from the site. For planning purposes, the site needs to know whether there are contamination concerns beneath the building footprint. The purpose of the sampling is to determine if subsurface contamination exists beneath the footprint of the TTA at levels that would require remediation.

Characterization activities carried out under this PSP will be performed in accordance with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ), the Sitewide Excavation Plan (SEP), the Waste Acceptance Criteria (WAC) Attainment Plan for the On-Site Disposal Facility (OSDF), and Data Quality Objective (DQO) SL-048, Revision 5.

1.2 SCOPE

This PSP covers all data collection activities associated with characterization data collection beneath the footprint of the TTA. All data collection activities will be consistent with the SCQ and Section 3.1 (predesign investigation), 3.3 (remedial design and the IRDP), and 3.4 (certification) of the SEP, unless noted explicitly otherwise. The data collected will be used to determine whether contamination exists below the TTA at levels above the FRLs. In the event that contamination is encountered above FRL levels, the data will be used to support the design of eventual remediation work. Physical samples will be collected in accordance with DQO SL-048, Revision 5 and SL-056, Revision 0 (Appendix A). All sampling activities and characterization data collection activities will conform to the requirements of the documents listed in Section 6.0.

1.3 KEY PERSONNEL

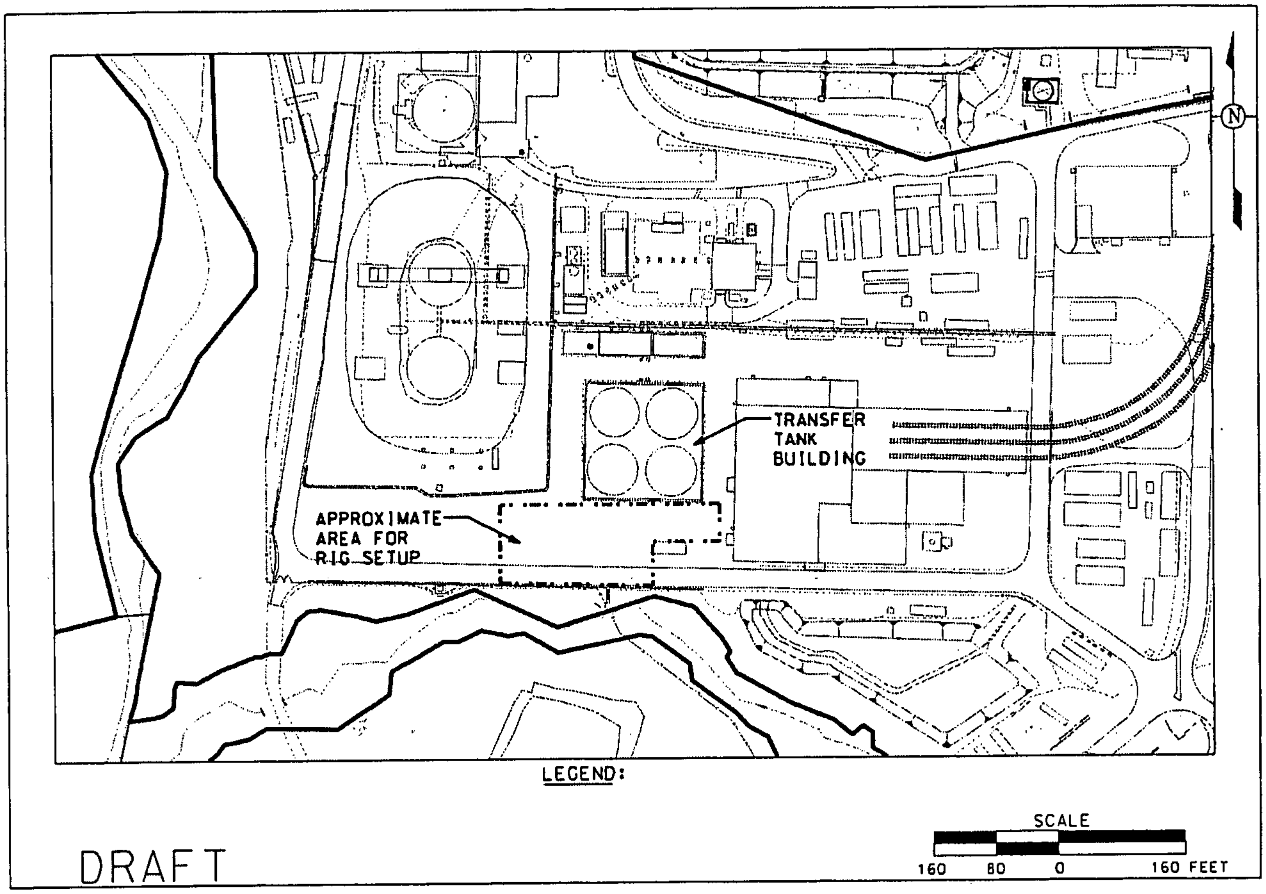
The team members responsible for coordination of work in accordance with this PSP are listed in Table 1-1.

TABLE 1-1
KEY PERSONNEL

Title	Primary	Alternate
DOE Contact	Nina Akgunduz	Johnny Reising
Project Manager	Jyh-Dong Chiou	Rich Abitz
Characterization Manager	Frank Miller	Denise Arico
Field Sampling Lead	Tom Buhrlage	Jim Hey
Surveying Lead	Jim Schwing	Andy Clinton
WAO Contact	Linda Barlow	Scott Osborne
Laboratory Contact	Heather Medley	Kathy Leslie
Data Validation Contact	Jim Chambers	Andy Sandfoss
Field Data Validation Contact	Dee Dee Early	Andy Sandfoss
Data Management Lead	Denise Arico	Krista Flaugh
Radiological Control Contact	Joe Dickey	Dwight Werner
FACTS/SED Database Contact	Kym Lockard	Susan Marsh
Quality Assurance Contact	Reinhard Friske	Darren Wessel
Safety and Health Contact	Scott Manley	Barry Ko

FACTS – Fernald Analytical Computerized Tracking System
SED – Sitewide Environmental Database
TBD – to be determined
WAO – Waste Acceptance Organization

FIGURE 1-1 LOCATION OF THE TRANSFER TANK BUILDING



2.0 CHARACTERIZATION OF SUBSURFACE TTA SOILS

2.1 HISTORY

The area of concern addressed by this PSP includes subsurface soils that fall within the TTA facility footprint. The location of the TTA is shown in Figure 1-1. The TTA facility was constructed in 2001 to assist in handling expected waste streams from the silos. The TTA was built in an open area previously not used for site activities. The footprint for the TTA facility is square, approximately 156 feet on each side. The facility was built on a concrete slab. The slab is underlain with six inches of mud mat. Beneath the mud mat are original soils that have been compacted. The original elevation of the area ranged from approximately 570' MSL along the southern edge to 575' along the northern edge. When the TTA was constructed, the original surface soils were removed and placed in the OSDF, and the area graded and compacted. The elevation of the slab bottom around the edges of the building is 573' MSL. The slab slopes down from the east/west edges towards the center to facilitate drainage into a receptor trench. The receptor trench runs north-south through the center of the building, with its surface sloping from the north and south ends towards a buried sump located in the middle of the building. The elevation of the trench bottom is 572'. The elevation of the base of the sump is 570' 3".

Figure 2-1 provides historical photos of the Silos Area from 1954 to 2000. Figure 2-2 shows a current aerial photo of the area. In Figure 2-2, the TTA is the square white facility to the right of the silos. Figure 2-3 shows a plan view drawing of the southern half of the TTA building slab, including the location of the receptor trench and various cross-section views. These cross-section views are shown in greater detail in Figure 2-4. Figure 2-5 shows a profile view of the subsurface for the TTA and Silos Area.

There have been several sampling programs conducted to date in the vicinity of the TTA, primarily to characterize the nature and extent of contamination associated with Silos activities. The most recent were three vertical soil cores along the western portion of the TTA building to a depth of 5.5 feet. Historical data collection has included surface and near surface soil sampling, slant bores under Silos 1 and 2, and vertical bores through the embankment surrounding Silos 1 and 2. Figures 2-6, 2-7, and 2-8 show the results for these sampling programs for total uranium, radium-226, and thorium-232, respectively, for the larger Silos Area. Figures 2-9, 2-10, and 2-11 provide a more detailed view of results specific to the TTA and include the original surface elevation contours for the area. For locations where more than one sample is at the same easting and northing, the location is color-coded by the highest radionuclide activity concentration observed, regardless of the depth. Unfortunately real-time surface scanning and measurement systems such as the *in situ* HPGe and mobile NaI systems have not been successfully deployed in the TTA or Silos Area because of shine interference from the silos.

For uranium, contamination above FRL levels appears in spotty surface locations. The one slant bore (1618) to penetrate subsurface soils under Silo 1 also consistently encountered uranium above FRL levels in the sand/silt layer directly beneath the silo. This bore also yielded the highest total uranium concentration for soil samples from the Silos Area, 160 ppm. Slant bore 1618 eventually terminated in clean clay. Slant bore 1617 never penetrated the near surface layer of clay, and also did not encounter significant uranium levels (e.g., above 50 ppm). Although slant bore 1616 presumably sampled soils in the vicinity of the Silos Area decant sump, it did not encounter uranium at significantly elevated levels. Slant bores 1615 and 1619 did penetrate through the near surface clay layer, but did not encounter uranium above 50 ppm at those depths. Uranium concentrations in the immediate vicinity of the TTA footprint ranged from background up to 30 ppm. Elevated uranium in the immediate vicinity of the TTA appeared to be confined to surface and near surface soils. There is no historical evidence of uranium contamination above FRL levels for soils immediately adjacent to or beneath the TTA building.

Radium-226 contamination above FRL levels is present at several locations in the Silos Area. Significant radium-226 soil contamination was encountered to the west of the Silos Area in exposed soils along the bluff above Paddy's Run, presumably due to contamination from the decant sump. Near surface radium-226 contamination was encountered in a series of soil samples around Silo 3. Insufficient data was collected in this area to determine the depth of radium impacts. Radium-226 was also encountered in soils beneath the embankment around Silos 1 and 2 that would have constituted the original soil surface before the embankments were put in place. In general, the slant bores through the embankment encountered elevated radium-226 near the original soil surface, but not at significant depth. The highest radium-226 soil sample values for this area (876 pCi/g) came from a vertical bore through the embankment at a depth of 30 feet, which again was approximately the depth of the original soil surface for this area. Radium-226 activity concentrations in the immediate vicinity of the TTA footprint ranged from background up to 3.32 pCi/g. Radium-226 activity concentrations above FRL levels were observed to depth in the recent series of three soil cores obtained to the west of the TTA foundation (Figure 2.10). For two of these bores, radium-226 contamination above FRL levels extended deeper than the completion depth of the soil cores (5.5 feet).

Elevated thorium-232 activity concentrations were primarily observed in samples from surface soils in the area surrounding Silo 3. This is consistent with the waste streams that fed this particular silo, which were high in thorium. The highest thorium-232 activity concentration observed was 4.6 pCi/g. There was insufficient data from this area to determine the depth of impacts. No significant thorium-232 contamination was observed around Silos 1 and 2. There was, however, elevated thorium-232 associated with the feeder trench coming from the production area towards the Silos area. Thorium-232 activity concentrations in the immediate vicinity of the TTA footprint ranged from background up to 3.4 pCi/g. The one sample yielding thorium-232 activity concentrations above FRL levels represented surface soils that were removed and placed in the OSDF as part of the TTA construction process.

The majority of the available historical soil sampling information pertains only to the major radionuclides of concern for the site, radium-226, total uranium, and thorium-232. The exception to this is the recent three soil cores obtained along the western edge of the TTA building. Samples from these cores were analyzed for all of the primary and secondary contaminants of concern pertinent to this area. For the chemical analytes, only arsenic was present at levels that exceeded its FRL (12 ppm). Arsenic values for the nine samples from these three cores ranged from 5.1 to 14.5 ppm. However, all but one of these values was qualified by the laboratory as an estimated value (indicating the result was close to detection limits and consequently had a relative high level of uncertainty).

In addition to soil sampling, there is one shallow groundwater monitoring point that is pertinent to the TTA area. This is well 1033, which is approximately 35 feet north of the TTA building's northwest corner. The primary groundwater contaminant of concern across the site is uranium. This well has uranium results for several years beginning with 1988 through 1998. In this period, total uranium concentrations varied between 4 and 32 μg/L, indicative of minimal impacts.

2.2 DETERMINATION OF FRL COCs AND WAC COCs

2.2.1 WAC COCs

There is no historical evidence of material beneath the TTA Building exceeding WAC levels. While it is unlikely that concentrations will be encountered that exceed WAC levels, sampling results will be compared to the appropriate WAC requirements for total uranium and technetium-99.

2.2.2 Primary and Secondary COCs

The TTA falls within RA 7, as defined by the SEP. Primary COCs for RA 7 include radium-226, radium-228, thorium-228, thorium-232, and total uranium (Table 2-7, SEP). Secondary COCs include aroclor-1254, aroclor-1260, arsenic, beryllium, cesium-137, dieldrin, lead, lead-210, manganese, technetium-99, and thorium-230 (Table 2-7, SEP). Little data exist with respect to the majority of these parameters for the TTA building area. Therefore, all primary and secondary COCs will be retained for this investigation.

2.3 DATA COLLECTION STRATEGY

Contamination is known to exist in the Silos Area above FRL levels. The primary purpose of data collection is to determine if contamination exists in subsurface soils above FRL levels beneath the TTA footprint. The characterization work will rely on the retrieval of soil cores and appropriate laboratory analyses of selected core intervals. Because of the tanks inside the TTA facility, directional drilling will be used to gain access to subsurface soils beneath the facility.

2.3.1 Sampling Design

Because vertical access to subsurface soils will not be possible, soil samples will be retrieved via directional drilling. Four subsurface directionally drilled bores will be completed from four different launching points. Four intact soil cores will be retrieved from each bore to be sub-sampled. The directional bores will be completed so that the retrieved soil cores will be within six inches of the mud mat beneath the TTA slab to the extent possible as field conditions and drilling guidance systems permit. If this target depth is not feasible, then sample collection within one foot of the mud mat is acceptable when field conditions preclude the six-inch target depth. The justification for selecting this depth interval is that if contamination is present beneath the TTA building, it is most likely to be found in near-surface soils. This assumption is consistent with the patterns of contamination observed in historical samples from the TTA building area. The position of these samples along each core's length will be selected to ensure that a distinct interval can be recorded and associated spatially with appropriate x, y, and z coordinates.

Figure 2-12 shows the proposed locations of each of the cores, their trajectory, and proposed sampling locations (soil core retrieval). The southern foundation of the TTA building is 156 feet in length. This foundation was divided into four equal segments. A start location for a directionally drilled core was selected at random from each of these four segments. Core 1 begins 25 feet from the western boundary of the TTA building. Core 2 begins 51 feet from the western boundary. Core 3 begins 90 feet from the western boundary. Core 4 begins 138 feet from the western boundary. Each of the cores will be oriented north-south. This orientation ensures that the bottom depth of the TTA building slab is constant over the run of the core.

Core sample locations were selected by dividing the length of each core immediately under the TTA building footprint into four equal segments. A sample location was selected at random from each segment for each core, with the additional constraint that no core sampling location could be within 20 feet of another core sample location. The locations of target soil cores as measured down the core from the southern building foundation in feet are: Core 1 – 7 ft, 40 ft, 106 ft, and 139 ft; Core 2 – 5 ft, 54 ft, 84 ft, and 152 ft; Core 3 – 35 ft, 68 ft, 89 ft, and 125 ft; and Core 4 – 29 ft, 55 ft, 112 ft, and 134 ft. Soil cores will be retrieved in a manner that minimizes impacts from drilling fluids.

There is a copper grounding wire buried around the perimeter of the TTA building foundation at a depth of approximately 3 feet below existing grade, and approximately 3 feet out from the foundation. This grounding wire is not "live" and does not pose an ES&H or technical hazard to the proposed work. If the wire is breached by the directional drilling, it will need to be repaired after drilling work is complete. There is also a buried 30" storm sewer line that passes diagonally from northeast to southwest underneath the southwest corner of the TTA building (Figure 2-12). This line is at a depth of approximately eight feet below the surface grade, and is not expected to be a complicating factor for directional drilling given the depths of the proposed soil cores.

All samples will be analyzed for the entire list of COCs discussed in section 2.3.2.

2.4 SAMPLE IDENTIFICATION

All physical samples will be assigned unique alpha-numeric identifications for data tracking purposes. Identifiers will contain one or more of the following designators:

1. Area/Sub Area Designator: Denotes physical sampling area:
   A7 = Remediation Area 7
   TTA = Tank Transfer Area

2. Location Designator: Denotes horizontal boring number and sequential sample number for that boring:
   HB1 through HB4 = Horizontal borings 1, 2, 3, and 4
   1, 2, 3, 4 = sequential sample numbers for samples collected from each boring

3. Depth Interval (if applicable): 1 = Equals two times the depth interval of 0.5 feet

4. Measurement Designator:
   - R = Radiological analyses
   - M = Metals analyses
   - P = Pesticides and PCBs
   - V = Archived sample

5. Quality Control Designators (if necessary):
   - D = Duplicate
   - X = Rinsate
   - Y = Container blank

A "^" will be placed between the Location Designator and Depth Interval. Using these guidelines, the unique identification scheme for a physical sample taken from the fourth interval of the second boring and analyzed for radionuclides is as follows:

A7-TTA-HB2-4^1-R

FIGURE 2-1 AERIAL PHOTOGRAPHS OF SILOS AREA

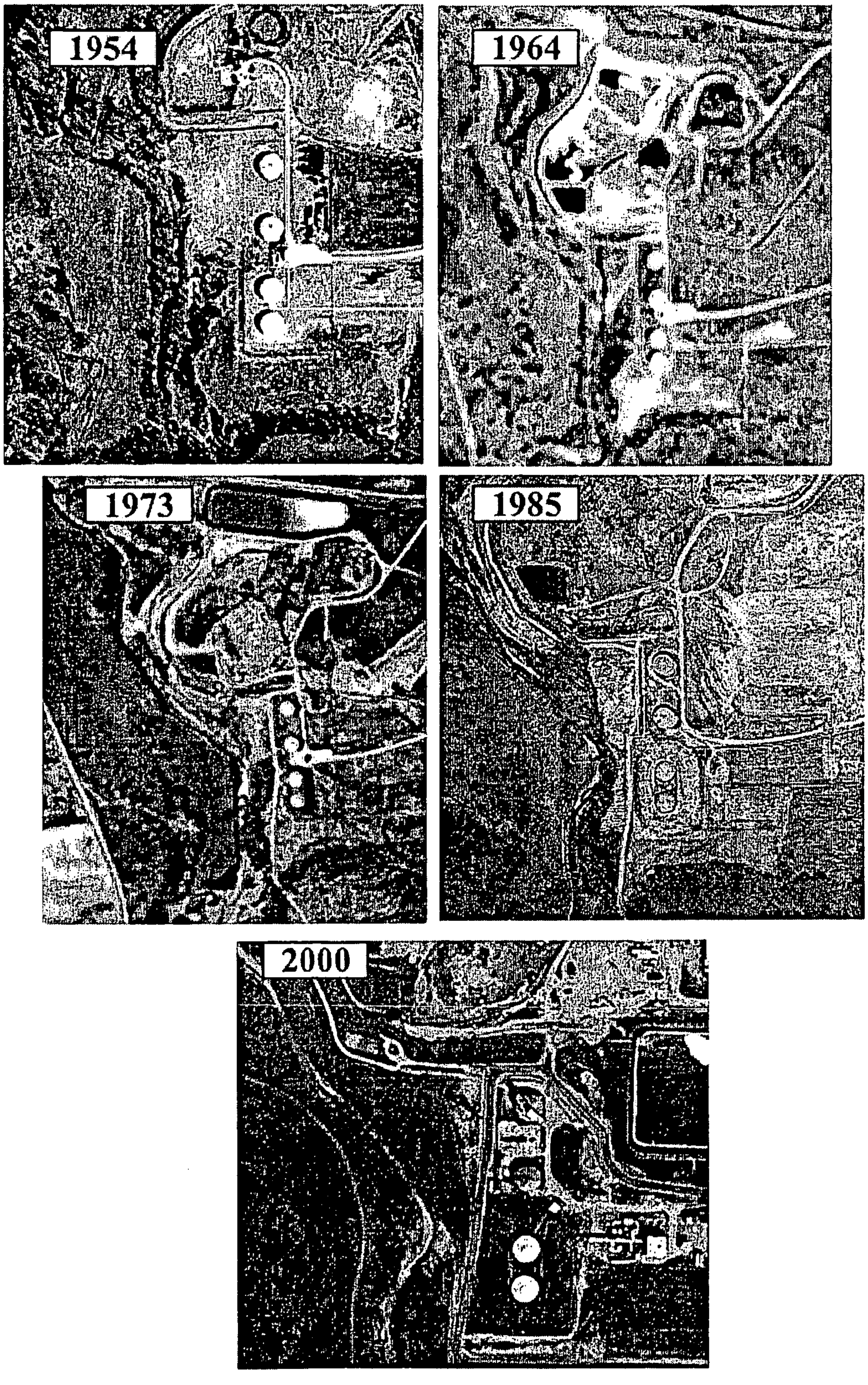


FIGURE 2-2 CURRENT AERIAL PHOTO OF TTA

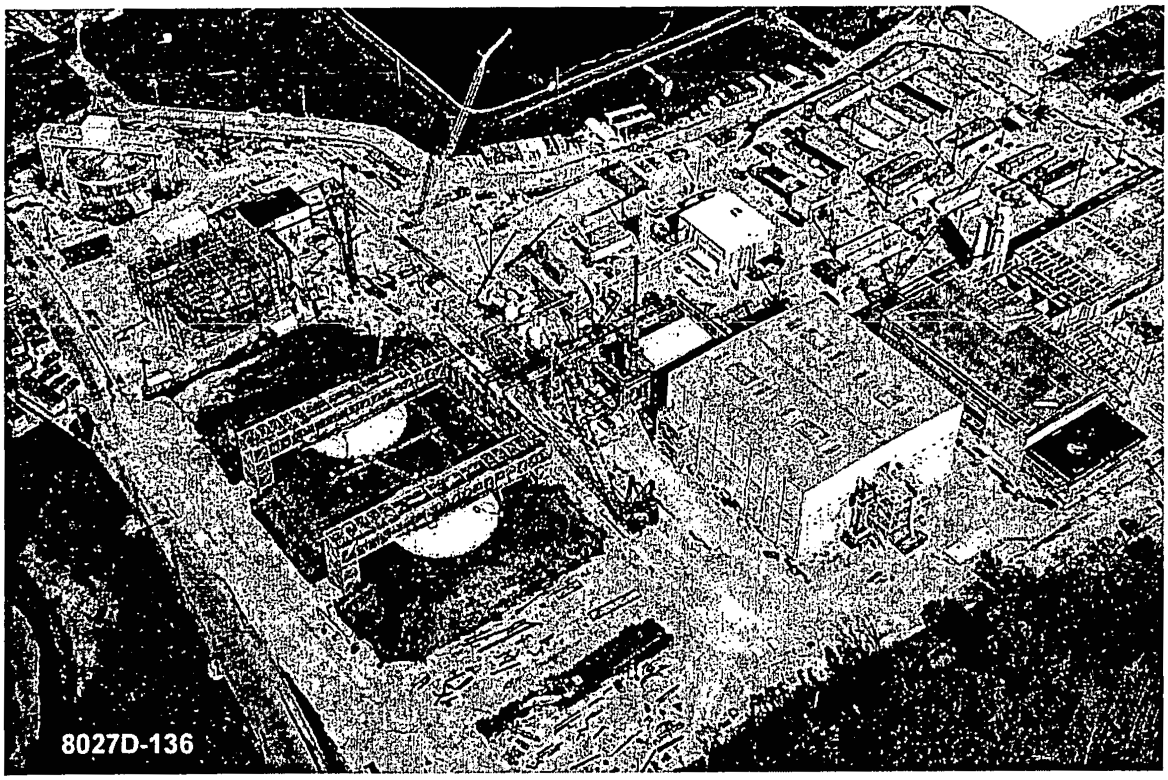
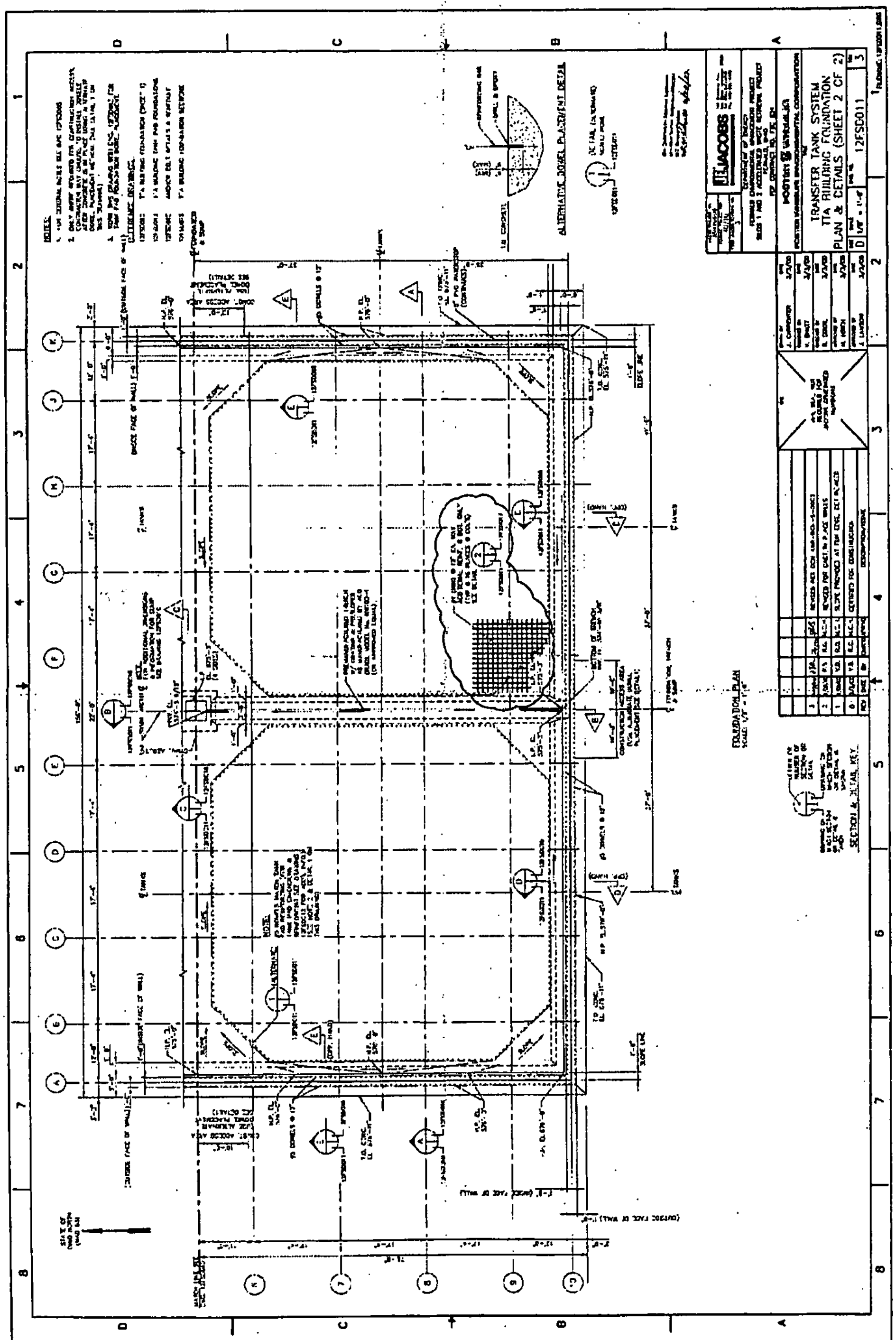


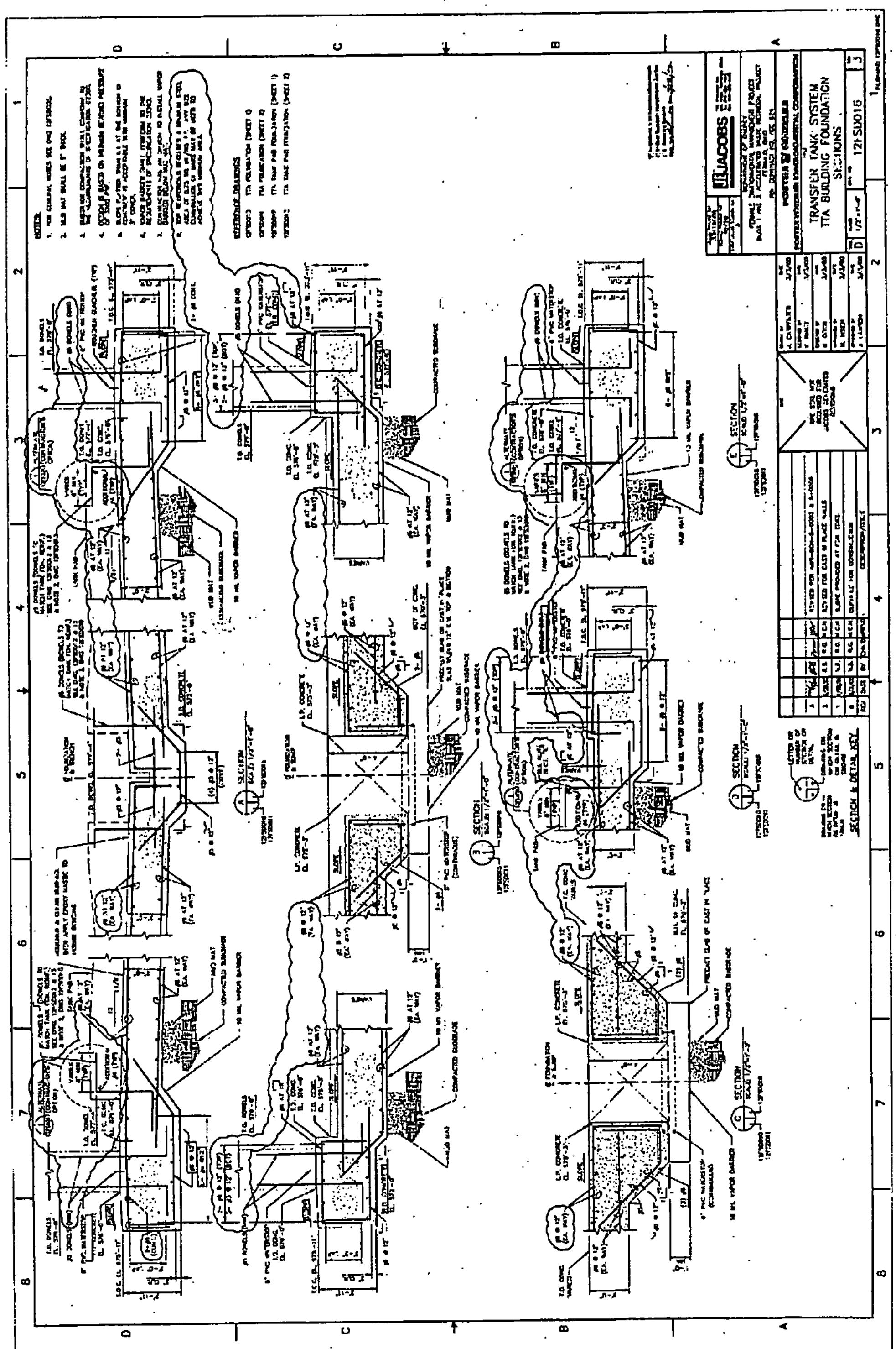
FIGURE 2-3 PLAN VIEW OF SOUTHERN HALF OF TTA SLAB



5584

1

FIGURE 2-4 CROSS-SECTIONS OF TTA SLAB



2

FIGURE 2-5 EAST-WEST SUBSURFACE PROFILE VIEW OF TTA AND SILOS AREA

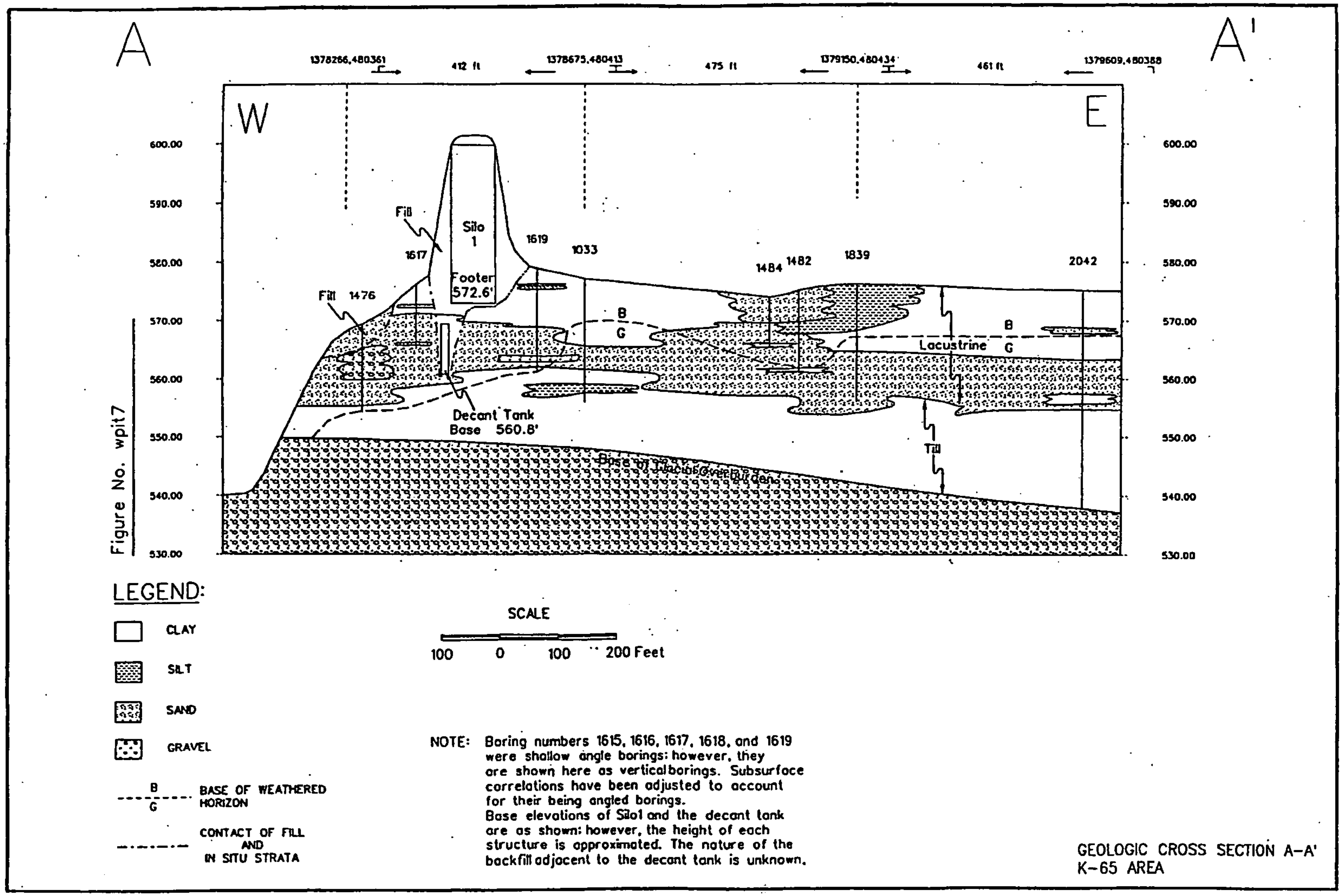


FIGURE 2-6 TOTAL URANIUM SOIL SAMPLE RESULTS FOR THE SILOS AREA

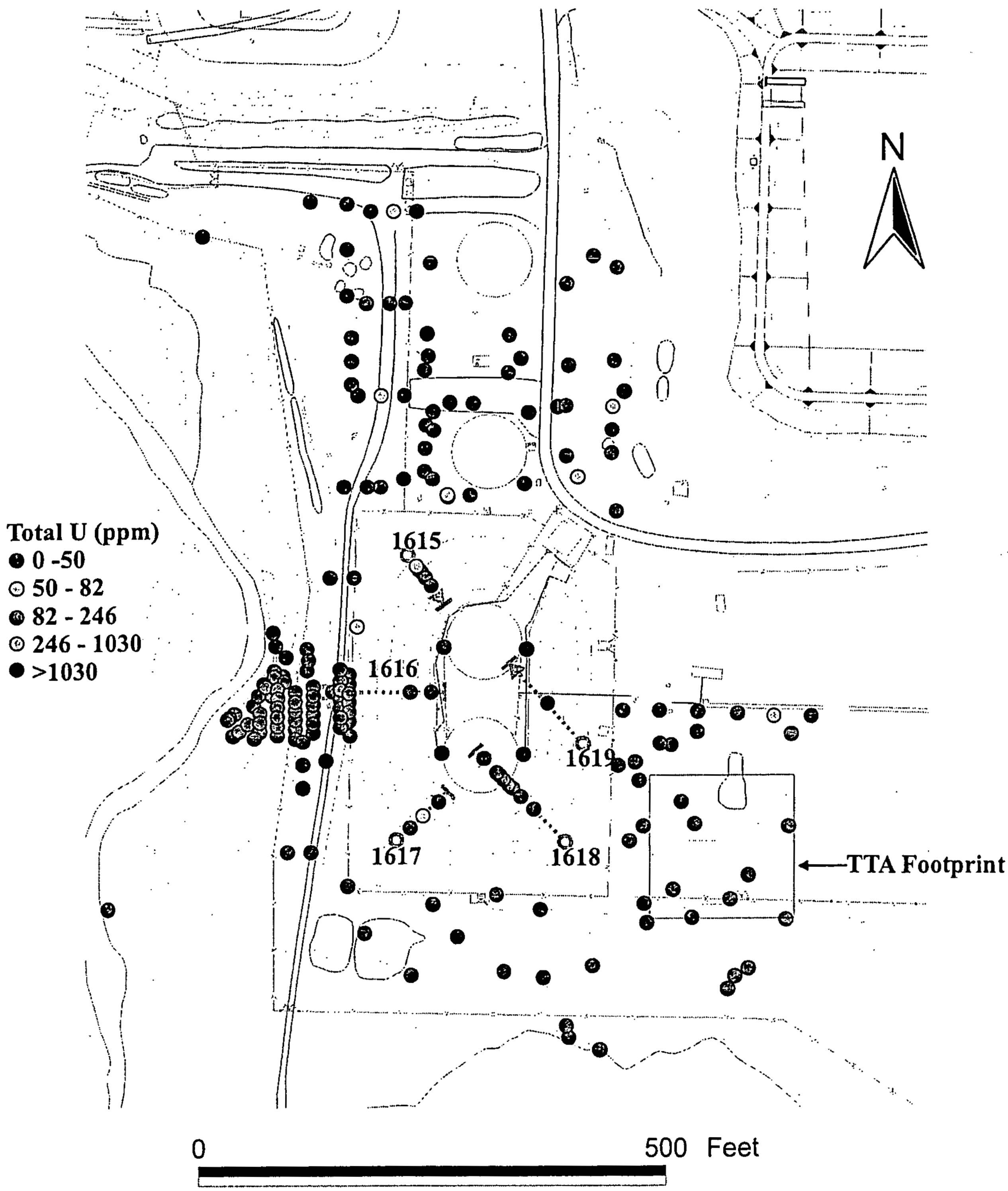


FIGURE 2-7 RADIUM-226 SOIL SAMPLE RESULTS FOR THE SILOS AREA

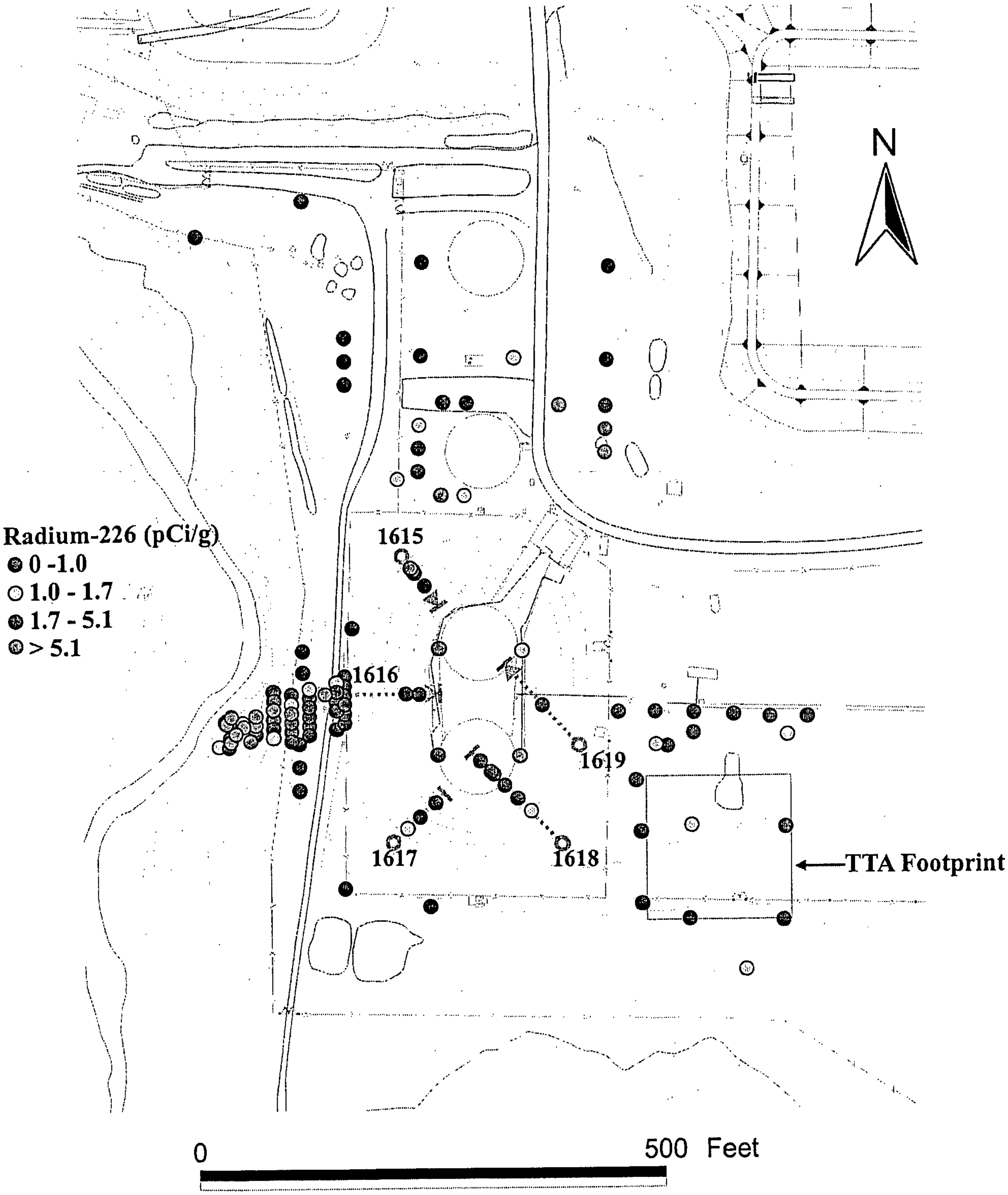
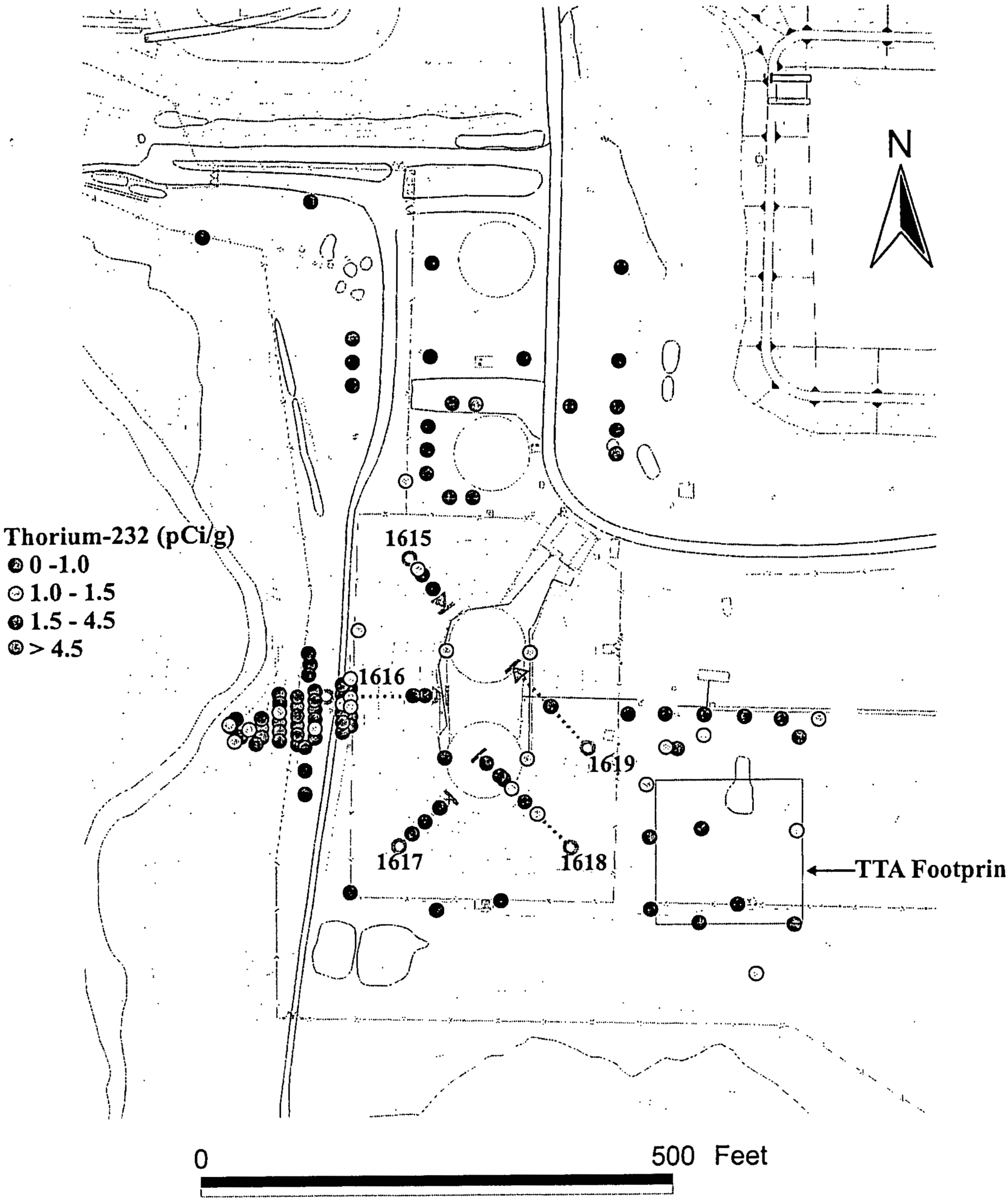
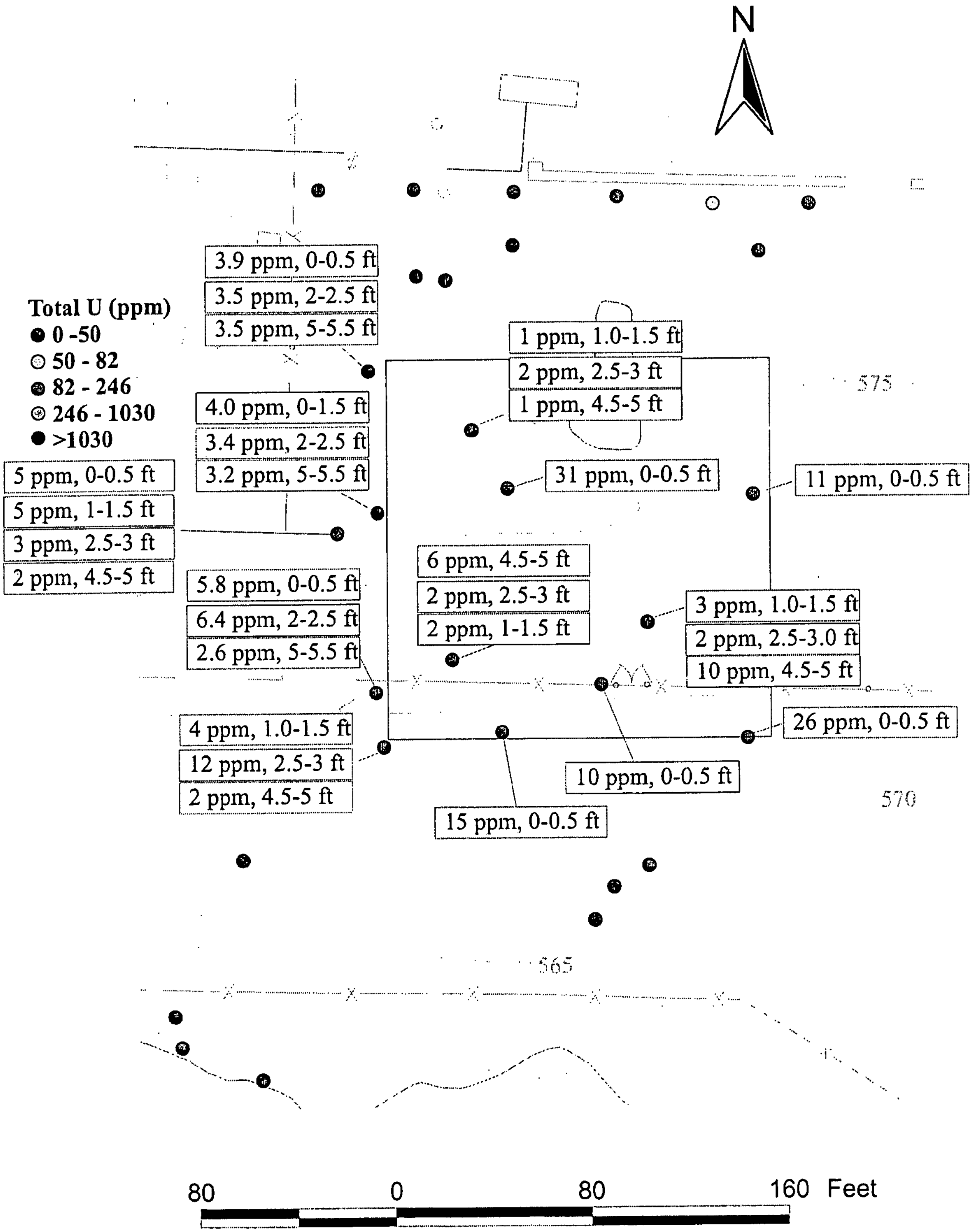


FIGURE 2-8 THORIUM-232 SOIL SAMPLE RESULTS FOR THE SILOS AREA



5584

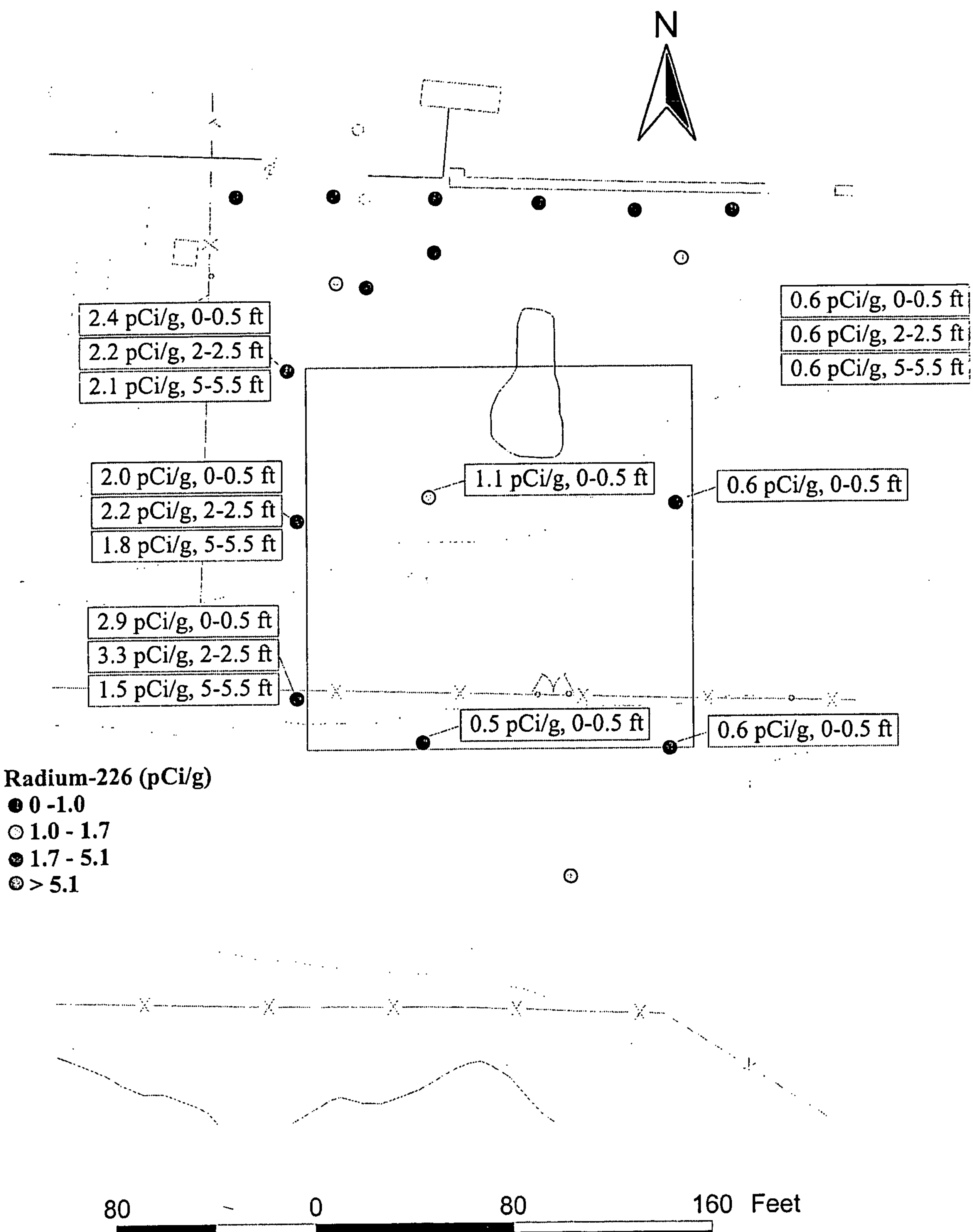
FIGURE 2-9 TOTAL U SOIL SAMPLE RESULTS FOR THE TTA



5584

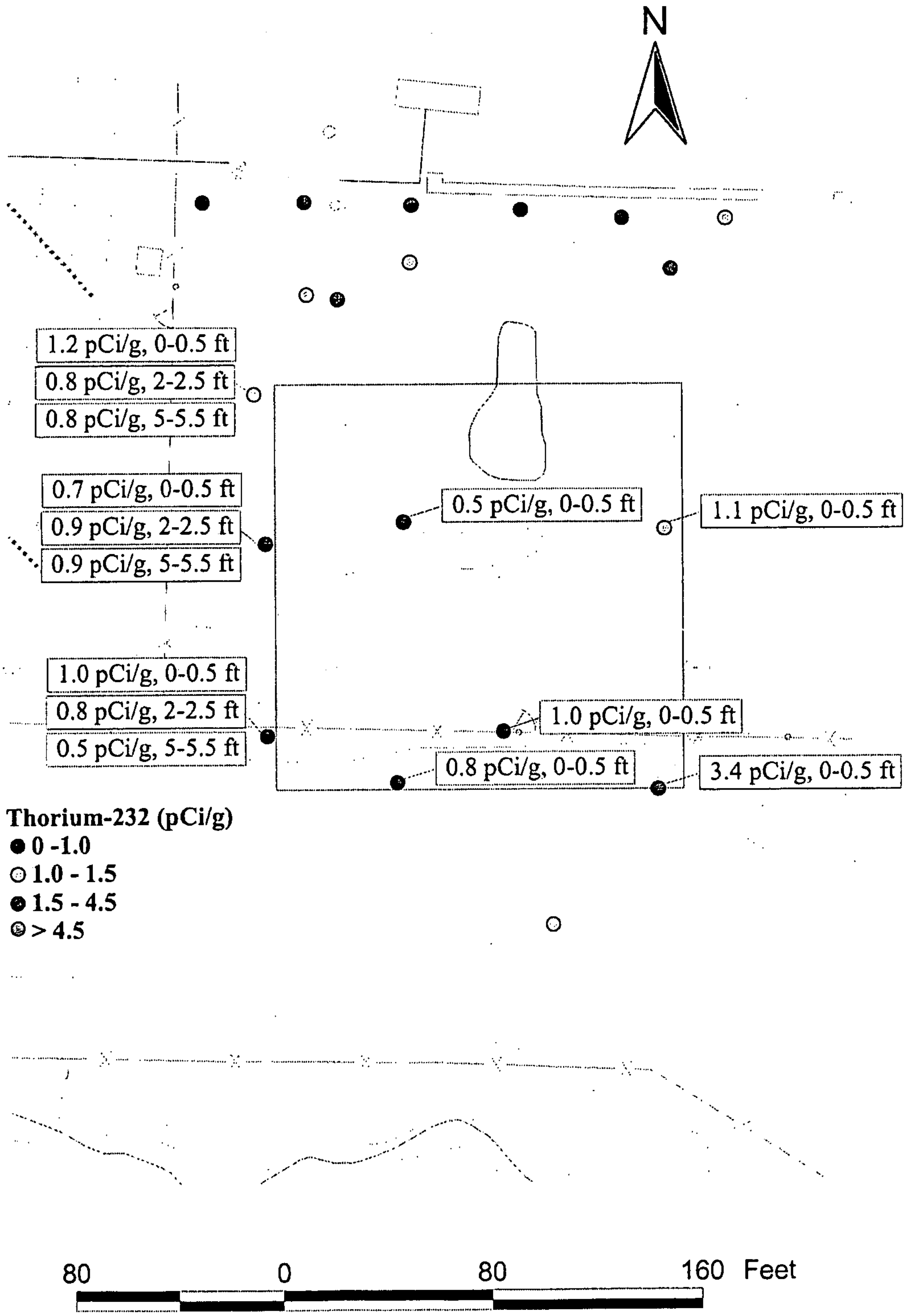
1

FIGURE 2-10 RA-226 SOIL SAMPLE RESULTS FOR THE TTA



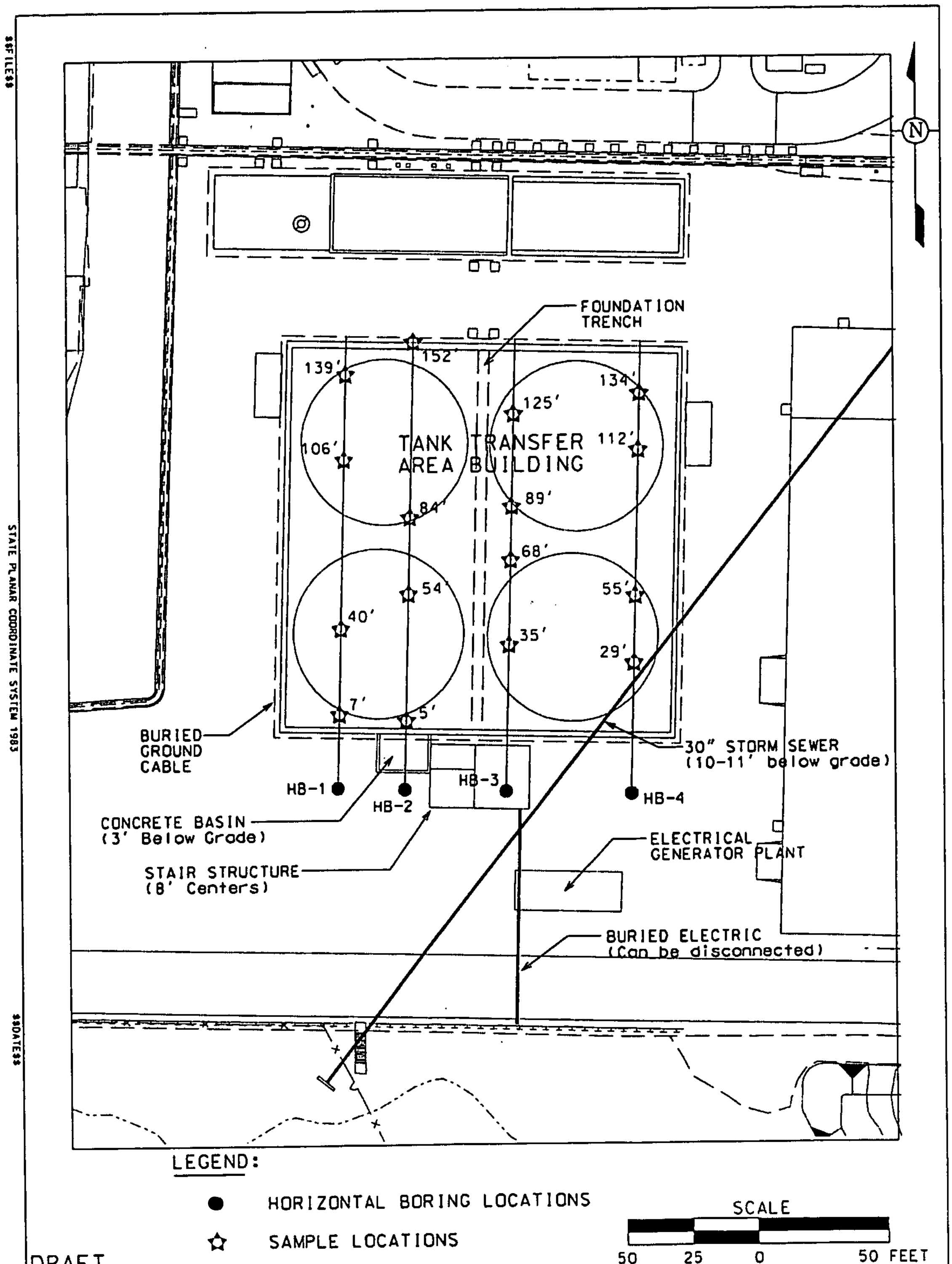
2

FIGURE 2-11 TH-232 SOIL SAMPLE RESULTS FOR THE TTA



1 **FIGURE 2-12 TTA HORIZONTAL BORING LOCATIONS**

2



3

3.0 SAMPLE COLLECTION AND METHODS

Samples will be collected from intact soil cores retrieved from target locations by directional drilling. When sampling is complete, a bentonite slurry will be used to grout each directionally drilled borehole.

3.1 SURVEYING SAMPLE POINTS

The location of each soil core retrieved will be determined by the guidance systems and logging of drill tool lengths in the borehole used by the drilling contractor. Locations will be provided as a bearing and distance from point of ground entry, along with an elevation relative to the point of entry. The locations of ground entry points for each directional core will be surveyed with coordinates provided as easting, northing, and elevation, with units in feet, NAD83, Ohio South Zone, #3402, and MSL. All field personnel using survey stakes or flags will mark field locations in a manner easily identifiable. Survey information (coordinate data) will be downloaded at the completion of each survey job or at the end of each day and transferred electronically to the Survey Lead. This information will be forwarded to the Data Management Lead.

3.2 SOIL SAMPLE COLLECTION

Samples will be collected from intact soil cores retrieved during directional drilling. Any debris (e.g., wood, concrete, metal) contained in a sample interval will be removed from the sample in the field and described on the Field Activity Log (FAL). Retrieved soil cores will be frisked for gross beta/gamma levels, and sampling of each six-inch core will focus on the intervals yielding the highest activity reading, if there are any above-background levels detected. The sampling and analytical requirements are summarized in Table 3-1. Any excess sample material will be archived and cooled.

Quality control requirements will include one duplicate field sample and one rinsate sample, which will be collected per procedure SMPL-21, Collection of Field Quality Control Samples. For the duplicate field sample, twice the soil mass will be collected at one location, and will not be homogenized with the original sample. The location that requires the collection of a duplicate sample is to be determined by the Field Sampling Lead. The rinsate sample will be collected (see Section 4.1) from rinse water utilized during the decontamination of reusable equipment.

All samples collected will be assigned unique customer sample numbers and FACTS identification numbers. The sample labels will be completed with sample collection information, and technicians will complete a FAL, a Sample Collection Log, and a Chain of Custody/Request for Analysis Form in the field prior to submittal of the samples. The rinsate sample will be listed on a separate Chain of Custody/Request for Analysis form. Based on historical data and process knowledge, no alpha/beta screens will be required for samples to be shipped off-site.

3.3 EQUIPMENT DECONTAMINATION

Sampling equipment that comes in contact with the soil to be sampled will be decontaminated to Level II before transporting to the sampling site and upon completion of each soil core retrieved. All decontamination will be Level II decontamination as specified in Procedure SMPL-01. All drilling equipment will be washed down using high-pressure water spray to remove visible soil or other foreign material.

3.4 SAMPLE SHIPPING AND ANALYSIS

All samples will be prepared for shipment to off-site laboratories per procedure 9501, Shipping Samples to Off-Site Laboratories. Samples will only be shipped to off-site laboratories that are on the Fluor Fernald Approved Laboratories List. The sampling and analysis requirements are listed in Table 3-1. Historical data for shipping is from borings located approximately 3' west of the TTA building. The highest results for each of the five sitewide primary radiological constituents are as follows: total uranium of 6.4 mg/kg and radium-226 of 3.32 pCi/g from A7-WTTA2; thorium-228 of 1.3 pCi/g from boring A7-WTTA3; and thorium-232 of 1.22 pCi/g from boring A7-WTTA1.

As soon as the samples arrive at the laboratory where the analysis will take place, all samples should be prepared for analysis, and radiological samples should be sealed to begin the in-growth period for radium analysis. The turnaround time for the chemical constituents is 14 days; a 30-day turnaround time is requested for the radiological constituents. All of the samples submitted for radiological analysis may be "batched" together by the off-site laboratory. At the discretion of the laboratory contact, the listed method may be changed if the required detection limit is still met. The Target Analyte Lists (TAL) are shown in Table 3-2.

3.5 DISPOSITION OF WASTES

The drilling process will result in waste drilling fluids (commonly referred to as drilling mud), decontamination water and PPE. The drilling fluid will consist of a guar gum/water mixture that is used to stabilize the borehole sidewalls (due to its viscosity), transport the soil cuttings to the surface and continuously cool the drill bit. (The guar gum powder is extracted from the seed of a leguminous shrub, where it acts as a food and water store.) The drilling fluid waste that exits the borehole at the surface as drilling proceeds consist of the guar gum/water mixture combined with soil cuttings. The drilling fluid is collected into a collection pit (approximately 4' wide and 3' deep) that will be excavated into the existing gravel base. Due to the viscosity of the spent drilling fluid, the penetration into the pit walls is expected to be minimal. The waste drilling fluid will be pumped from the pit as it reaches capacity and transferred to a nearby basin described below or into temporary bulk containers for eventual disposal in the same basin. The volume of drilling fluid waste is expected to range from 4,000 to 8,000 gallons (20 to 40 yd^3) dependent on several factors include the drilling rate and the number of trips in and out of the borehole to collect soil samples or to make course corrections.

The volume of excess soil sample material, if any, will be relatively small (<0.5 ft^3) and will be disposed of by combining the soil with the waste drilling fluids for disposition. The waste drilling fluids will be pumped or transferred to the Silos Project retention basin (south of the silos treatment building) where the solids (soil cuttings/guar gum) will settle out and be separated from the entrained water. An enzyme may be added to the waste drilling fluid prior to placement into the basin in order to breakdown the guar gum mixture to promote solids separation from the water phase. The drilling fluid waste generated under this project is covered by PWID 625 base on direction from WAO.

Decontamination water will consist of water generated from cleaning the drill rods prior to starting each borehole and cleaning of the core sampler. Contingent upon the approval of the Wastewater Discharge Request, this water will either be disposed of via the controlled stormwater drain near Silo 1 or mixed with the drilling mud and fluid over the course of the project.

5584

TABLE 3-1

SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte [a]	Method	Matrix	Preserve	Hold Time	Container [b]	Minimum Mass/Volume
Rads/Metals/Pest&PCBs (TALs ABC)	Gamma Spec and LSC ICP or ICP/MS GC	Solid	Cool, 4° C	12 months 6 months 14 days	Glass with Teflon-lined lid	500 g (1500 g) [c]
Rads (TAL A)	Gamma Spec and LSC	Liquid (Rinsate [d])	HNO_3 pH<2	6 months	Polyethylene	4 liters
Metals (TALB)	ICP or ICP/MS	Liquid (Rinsate [d])	HNO_3 pH<2	6 months	Polyethylene	500 milliliter

[a] Samples will be analyzed according to Analytical Support Level (ASL) D requirements but the minimum detection level may cause some analyses to be considered ASL E.
[b] Sample container types may be changed at the direction of the Field Sampling Lead, as long as the volume requirements, container compatibility requirements, and SCQ requirements are met.
[c] At the direction of the Field Sampling Lead, triple the specified volume must be collected for all samples at one location in order for the contract laboratory to perform the required quality control analysis. The samples shall be identified on the Chain of Custody/Request for Analysis forms as "designated for laboratory QC".
[d] If "push tubes" are used for sampling, the off-site laboratories will be sent container blanks. If an alternative sample method is used, a rinsate will be collected by the Field Technicians.

TABLE 3-2

TARGET ANALYTE LISTS

20500-PSP-0006-A
(Radiological - ASL D/E)

Analyte	On-Property FRL or WAC*	MDL
Total Uranium	82 mg/kg	8.2 mg/kg
Radium-226	1.7 pCi/g	0.17 pCi/g
Radium-228	1.8 pCi/g	0.18 pCi/g
Thorium-228	1.7 pCi/g	0.17 pCi/g
Thorium-230	280 pCi/g	28.0 pCi/g
Thorium-232	1.5 pCi/g	0.15 pCi/g
Cesium-137	1.4 pCi/g	0.14 pCi/g
Technetium-99	29.1 pCi/g	2.91 pCi/g
Lead-210	38 pCi/g	3.8 pCi/g

*WAC is only applicable to total uranium and technetium-99. The lower of the two will be used for setting the MDL.

20500-PSP-0006-B
(Metals - ASL D/E)

Analyte	On-Property FRL	MDL
Arsenic	12.0 mg/kg	1.2 mg/kg
Beryllium	1.5 mg/kg	0.15 mg/kg
Lead	400 mg/kg	40 mg/kg
Manganese	4600 mg/kg	460 mg/kg

20500-PSP-0006-C
(Pest & PCBs - ASL D/E)

Analyte	On-Property FRL	MDL
Aroclor-1254	0.13 mg/kg	0.013 mg/kg
Aroclor-1260	0.13 mg/kg	0.013 mg/kg
Dieldrin	0.015 mg/kg	0.0015 mg/kg

4.0 QUALITY ASSURANCE REQUIREMENTS

4.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS AND DATA VALIDATION

In accordance with the requirements of DQO SL-048 (Appendix A), the field quality control, analytical, and data validation requirements are as follows:

- All laboratory analyses will be performed at ASL D or E, where E meets the minimum detection level of 10 percent of the FRL and is above the SCQ ASL D detection level, but the analyses meet all other SCQ ASL D criteria.

  If "push tubes" are used for sample collection, one container blank will be collected before sample collection begins. The container blank sample will be analyzed for TALs A and B. If an alternate sample collection method is used, one rinsate will be collected at a minimum frequency of one per 20 pieces of equipment reused in the field.

- One sample will be designated as a "laboratory QC sample" on the Chain of Custody form for each release sent for off-site analysis. This sample will be at the discretion of the Field Sampling Lead and is to contain triple the specified mass as stated in Table 3-1. Contract specific laboratory QC analyses (e.g., matrix spike, duplicate, etc) will be performed on this sample.

- All analyses will be performed at ASL D or E, where E meets the minimum detection level of 10 percent of the FRL and is above the SCQ ASL D detection level, but the analyses meet all other SCQ ASL D criteria. An ASL D data package will be provided for all of the data.

- All field data will be validated. A minimum of 10 percent of the laboratory data will be validated to validation support level (VSL) D with the remainder validated to VSL B. If any result is rejected during validation, the sample will be re-analyzed or an archive location will be sampled and analyzed in its place. If necessary, this change will be documented in a V/FCN.

If any sample collection or analysis methods are used that are not in accordance with the SCQ, the Project Manager and Characterization Manager must determine if the qualitative data from the samples will be beneficial to WAC attainment decision making. If the data will be beneficial, the Project Manager and Characterization Manager will ensure that:

- The PSP is revised through a V/FCN to include references confirming that the new method is sufficient to support data needs,

- Variations from the SCQ methodology are documented in the PSP, or

- Data validation of the affected samples is requested or qualifier codes of J (estimated) and R (rejected) be attached to detected and non-detected results, respectively.

4.2 APPLICABLE PROCEDURES, MANUALS AND DOCUMENTS

To assure consistency and data integrity, field activities in support of this PSP will follow the requirements and responsibilities outlined in controlled procedures and manufacturer operational manuals. Applicable procedures and manuals include the following:

- 20100-HS-0002, Soil and Disposal Facility Project (SDFP) Integrated Health and Safety Plan
- 9501, Shipping Samples to Offsite Labs
- 9503, Processing Samples through the Sample Processing Laboratory
- ADM-02, Field Project Prerequisites
- EP-0003, Unexpected Discovery of Cultural Resources
- EW-0002, Chain of Custody/Request for Analysis Record for Sample Control
- FD-1000, Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA Quality (SCQ) Assurance Project Plan
- Fernald Closure Project Approved Laboratories List
- RM-0020, Radiological Control Requirements Manual
- RM-0021, Safety Performance Requirements Manual
- SH-1006, Event Investigation and Reporting
- Sitewide Excavation Plan (SEP)
- SMPL-01, Solids Sampling
- SMPL-21, Collection of Field Quality Control Samples
- WAC Attainment Plan for the OSDF

4.3 PROJECT REQUIREMENTS FOR INDEPENDENT ASSESSMENTS

Project management has ultimate responsibility for the quality of the work processes and the results of the sampling activities covered by this PSP. The Quality Assurance (QA) organization may conduct independent assessments of the work process and operations to assure the quality of performance. Assessment will encompass technical and procedural requirements of this PSP and the SCQ. Independent assessments will be performed by conducting a surveillance. Surveillances will be planned and documented according to Section 12.3 of the SCQ.

4.4 IMPLEMENTATION OF FIELD CHANGES

Before implementation of changes, the Field Sampling Lead will be informed of the proposed changes. Once the Field Sampling Lead has obtained written or verbal approval (electronic mail is acceptable), the changes may be implemented. Changes to the PSP will be noted in the applicable FALs and on a V/FCN. QA must receive the completed V/FCN, which includes the signatures of the Characterization Manager, Sampling Lead, Project Manager, and QA, within seven working days of implementation of the change. All significant field changes require regulatory agency approval.

5.0 SAFETY AND HEALTH

Applicable work permits will be obtained per SH-0021, Work Permits, by the Soil Sampling Manager or designee. All work performed on this project will be performed in accordance with applicable Environmental Services procedures, RM-0020 (Radiological Control Requirements Manual), RM-0021 (Safety Performance Requirements Manual), Fluor Fernald work permits, RWP, penetration permits, and other applicable permits. Concurrence with applicable safety permits (as indicated by the signature of each field employee assigned to this project) is required by each employee in the performance of their assigned duties. **A safety briefing will be conducted prior to the initiation of field activities.**

The drilling contractor will be responsible for obtaining approval for and complying with their own work plan and/or health and safety plan that specifically addresses the anticipated hazards of directional drilling operations. The safety representative for the contractor and Fluor Fernald, Inc. personnel performing work on this project will assess the safety of performing drilling and core sampling activities. This will include drill rig and other vehicle positioning limitations and hazards pertaining to working with drilling tools, ground penetration, excavation, work in shallow pits (for drilling mud), and lock and tag (as necessary).

A job/safety briefing will be conducted before field activities begin each day. The project lead or designee will document the briefing on form FS-F-2955. Personnel will also be briefed on any health and safety documents (such as Travelers) that may apply to the project work scope. Additionally, personnel who will be in the area will be briefed to the contractor's health and safety plan requirements for PPE, safe distances, etc. All personnel have stop-work authority for imminent safety hazards or other hazards resulting from noncompliance with the applicable safety and health practices.

The Field Sampling Lead will ensure that each technician performing sampling related to this project has been trained to the relevant sampling procedures, including safety precautions. Technicians who do not sign project safety and technical briefing forms will not participate in the execution of sampling activities related to the completion of assigned project responsibilities. A copy of applicable safety permits/surveys issued for worker safety and health will be posted at the sampling area during sampling activities. Technicians will be provided with cellular phones for all sampling activities, and **all emergencies will be reported by dialing 648-6511 and asking for "CONTROL".** Announcements for severe weather will be provided on the Emergency Message System and by alphanumeric page. Pagers and cellular phones are provided to the technicians by the FCP.

6.0 DATA MANAGEMENT

A data management process will be implemented so information collected during the investigation will be properly managed to satisfy data end use requirements after completion of field activities. As specified in Section 5.1 of the SCQ, sampling teams will describe daily activities on a FAL, which should be sufficiently detailed for accurate reconstruction of the events without reliance on memory. Sample Collection Logs will be completed according to protocols specified in Appendix B of the SCQ and in applicable procedures. These forms will be maintained in loose-leaf form and uniquely numbered following the sampling event.

All field measurements, observations, and sample collection information associated with physical sample collection will be recorded, as applicable, on the Sample Collection Log, the FAL, the Chain of Custody/Request for Analysis form, the Lithologic Log, and Borehole Abandonment Record. The PSP number will be on all documentation associated with these sampling activities.

Samples will be assigned a unique sample number as explained in Section 2.3 and listed in Appendix B. This unique sample identifier will appear on the Sample Collection Log and Chain of Custody/Request for Analysis form and will be used to identify the samples during analysis, data entry, and data management.

Technicians will review all field data for completeness and accuracy then forward the field data package to the Field Data Validation Contact for final QA/QC review. Analytical data will be entered into the SED by Sample Data Management personnel. Analytical data that is designated for data validation will be forwarded to the Data Validation Group. The PSP requirements for analytical data validation are outlined in Section 4.1. Analytical data will be reviewed by the Data Management Lead upon receipt from the off-site laboratories, and if needed, will complete a data group form for each material tracking location (as identified by WAO) and transmit the form to WAO for WAC documentation.

Following field and analytical data validation, the Sample Data Management organization will perform data entry into the SED. The original field data packages, original analytical data packages, and original documents generated during the validation process will be maintained as project records by the Sample Data Management organization.

To ensure that correct coordinates and survey information are tied to the final sample locations in the database, the following process will take place. Upon surveying all locations identified in the PSP, the Surveying Manager will provide the Data Management Lead (i.e., Characterization) with an electronic file of all surveyed coordinates and surface elevations. The Sampling Manager will provide the Data Management Lead with a list of any locations that must be moved during penetration permitting or sample collection, and the Data Management Lead will update the electronic file with this information. After sample collection is complete, the Data Management Lead will provide this electronic file to the Database Contact for uploading to SED.

APPENDIX A

DATA QUALITY OBJECTIVES
SL-048, REVISION 5

Control Number ________

Fernald Environmental Management Project

Data Quality Objectives

Title: Delineating the Extent of Constituents of Concern During Remediation Sampling

Number: SL-048

Revision: 5

Effective Date: February 26, 1999

Contact Name: Eric Kroger

Approval: (signature on file) Date: 2/25/99
James E. Chambers
DQO Coordinator

Approval: (signature on file) Date: 2/26/99
J.D. Chiou
SCEP Project Director

Rev. #	0	1	2	3	4	5	6
Effective Date:	9/19/97	10/3/97	4/15/98	6/17/98	7/14/98	2/26/99	

DATA QUALITY OBJECTIVES
Delineating the Extent of Constituents of Concern During Remediation Sampling

Members of Data Quality Objectives (DQO) Scoping Team
The members of the DQO team include a project lead, a project engineer, a field lead, a statistician, a lead chemist, a sampling supervisor, and a data management lead.

Conceptual Model of the Site
Media is considered contaminated if the concentration of a constituent of concern (COC) exceeds the final remediation levels (FRLs). The extent of specific media contamination was estimated and published in the Operable Unit 5 Feasibility Study (FS). These estimates were based on kriging analysis of available data for media collected during the Remedial Investigation (RI) effort and other FEMP environmental characterization studies. Maps outlining contaminated media boundaries were generated for the Operable Unit 5 FS by overlaying the results of the kriging analysis data with isoconcentration maps of the other constituents of concern (COCs), as presented in the Operable Unit 5 RI report, and further modified by spatial analysis of maps reflecting the most current media characterization data. A sequential remediation plan has been presented that subdivides the FEMP into seven construction areas. During the course of remediation, areas of specific media may require additional characterization so remediation can be carried out as thoroughly and efficiently as possible. As a result, additional sampling may be necessary to accurately delineate a volume of specific media as exceeding a target level, such as the FRL or the Waste Attainment Criterion (WAC). Each individual Project-Specific Plan (PSP) will identify and describe the particular media to be sampled. This DQO covers all physical sampling activities associated with Pre-design Investigations, precertification sampling, WAC attainment sampling or regulatory monitoring that is required during site remediation.

1.0 Statement of Problem

If the extent (depth and/or area) of the media COC contamination is unknown, then it must be defined with respect to the appropriate target level (FRL, WAC, or other specified media concentration).

2.0 Identify the Decision

Delineate the horizontal and/or vertical extent of media COC contamination in an area with respect to the appropriate target level.

3.0 Inputs That Affect the Decision

Informational Inputs - Historical data, process history knowledge, the modeled extent of COC contamination, and the origins of contamination will be required to establish a sampling plan to delineate the extent of COC contamination. The desired precision of the delineation must be weighed against the cost of collecting and analyzing additional samples in order to determine the optimal sampling density. The project-specific plan will identify the optimal sampling density.

Action Levels - COCs must be delineated with respect to a specific action level, such as FRLs and On-Site Disposal Facility (OSDF) WAC concentrations. Specific media FRLs are established in the OU2 and OU5 RODs, and the WAC concentrations are published in the OU5 ROD. Media COCs may also require delineation with respect to other action levels that act as remediation drivers, such as Benchmark Toxicity Values (BTVs).

4.0 The Boundaries of the Situation

Temporal Boundaries - Sampling must be completed within a time frame sufficient to meet the remediation schedule. Time frames must allow for the scheduling of sampling and analytical activities, the collection of samples, analysis of samples and the processing of analytical data when received.

Scale of Decision Making - The decision made based upon the data collected in this investigation will be the extent of COC contamination at or above the appropriate action level. This delineation will result in media contaminant concentration information being incorporated into engineering design, and the attainment of established remediation goals.

Parameters of Interest - The parameters of interest are the COCs that have been determined to require additional delineation before remediation design can be finalized with the optimal degree of accuracy.

5.0 Decision Rule

If existing data provide an unacceptable level of uncertainty in the COC delineation model, then additional sampling will take place to decrease the model uncertainty. When deciding what additional data is needed, the costs of additional sampling and analysis must be weighed against the benefit of reduced uncertainty in the delineation model, which will eventually be used for assigning excavation, or for other purposes.

6.0 Limits on Decision Errors

In order to be useful, data must be collected with sufficient areal and depth coverage, and at sufficient density to ensure an accurate delineation of COC concentrations. Analytical sensitivity and reproducibility must be sufficient to differentiate the COC concentrations below their respective target levels.

Types of Decision Errors and Consequences

Decision Error 1 - This decision error occurs when the decision maker determines that the extent of media contaminated with COCs above action levels is not as extensive as it actually is. This error can result in a remediation design that fails to incorporate media contaminated with COC(s) above the action level(s). This could result in the re-mobilization of excavation equipment and delays in the remediation schedule. Also, this could result in media contaminated above action levels remaining after remediation is considered complete, posing a potential threat to human health and the environment.

Decision Error 2 - This decision error occurs when the decision maker determines that the extent of media contaminated above COC action levels is more extensive than it actually is. This error could result in more excavation than necessary, and this excess volume of materials being transferred to the OSDF, or an off-site disposal facility if contamination levels exceed the OSDF WAC.

True State of Nature for the Decision Errors - The true state of nature for Decision Error 1 is that the maximum extent of contamination above the FRL is more extensive than was determined. The true state of nature for Decision Error 2 is that the maximum extent of contamination above the FRL is not as extensive as was determined. Decision Error 1 is the more severe error.

7.0 Optimizing Design for Useable Data

7.1 Sample Collection

A sampling and analytical testing program will delineate the extent of COC contamination in a given area with respect to the action level of interest. Existing data, process knowledge, modeled concentration data, and the origins of contamination will be considered when determining the lateral and vertical extent of sample collection. The cost of collecting and analyzing additional samples will be weighed against the benefit of reduced uncertainty in the delineation model. This will determine the sampling density. Individual PSPs will identify the locations and depths to be sampled, the sampling density necessary to obtain the desired accuracy of the delineation, and if samples will be analyzed by the on-site or off-site laboratory. The PSP will also identify the sampling increments to be selectively analyzed for concentrations of the COC(s) of interest, along with field work requirements. Analytical requirements will be listed in the PSP. The chosen analytical methodologies are able to achieve a detection limit capable of resolving the COC action level. Sampling of groundwater monitoring wells may require different purge requirements than those stated in the SCQ (i.e., dry well definitions or small purge volumes). In order to accommodate sampling of wells that go dry prior to completing the purge of the necessary well volume, attempts to sample the monitoring wells will be made 24 hours after purging the well dry. If, after the 24 hour period, the well does not yield the required volume, the analytes will be collected in the order stated in the applicable PSP until the well goes dry. Any remaining analytes will not be collected. In some instances, after the 24 hour wait the well may not yield any water. For these cases, the well will be considered dry and will not be sampled.

7.2 COC Delineation

The media COC delineation will use all data collected under the PSP, and if deemed appropriate by the Project Lead, may also include existing data obtained from physical samples, and if applicable, information obtained through real-time screening. The delineation may be accomplished through modeling (e.g. kriging) of the COC concentration data with a confidence limit specific to project needs that will reduce the potential for Decision Error 1. A very conservative approach to delineation may also be utilized where the boundaries of the contaminated media are extended to the first known vertical and horizontal sample locations that reveal concentrations below the desired action level.

7.3 QC Considerations

Laboratory work will follow the requirements specified in the SCQ. If analysis is to be carried out by an off-site laboratory, it will be a Fluor Daniel Fernald approved full service laboratory. Laboratory quality control measures include a media prep blank, a laboratory control sample (LCS), matrix duplicates and matrix spike. Typical Field QC samples are not required for ASL B analysis. However the PSPs may specify appropriate field QC samples for the media type with respect to the ASL in accordance with the SCQ, such as field blanks, trip blanks, and container blanks. All field QC samples will be analyzed at the associated field sample ASL. Data will be validated per project requirements, which must meet the requirements specified in the SCQ. Project-specific validation requirements will be listed in the PSP.

Per the Sitewide Excavation Plan, the following ASL and data validation requirements apply to all soil and soil field QC samples collected in association with this DQO:

- If samples are analyzed for Pre-design Investigations and/or Precertification, 100% of the data will be analyzed per ASL B requirements. For each laboratory used for a project, 90% of the data will require only a Certificate of Analysis, the other 10% will require the Certificate of Analysis and all associated QA/QC results, and will be validated to ASL B. Per Appendix H of the SEP, the minimum detection level (MDL) for these analyses will be established at approximately 10% of the action level (the action level for precertification is the

FRL; the action level for pre-design investigations can be several different action levels, including the FRL, the WAC, RCRA levels, ALARA levels, etc.). If this MDL is different from the SCQ-specified MDL, the ASL will default to ASL E, though other analytical requirements will remain as specified for ASL B.

- If samples are analyzed for WAC Attainment and/or RCRA Characteristic Areas Delineation, 100% of the data will be analyzed and reported to ASL B with 10% validated. The ASL B package will include a Certificate of Analysis along with all associated QA/QC results. Total uranium analyses using a higher detection limit than is required for ASL B (10 mg/kg) may be appropriate for WAC attainment purposes since the WAC limit for total uranium is 1,030 mg/kg. In this case, an ASL E designation will apply to the analysis and reporting to be performed under the following conditions:

    - all of the ASL B laboratory QA/QC methods and reporting criteria will apply with the exception of the total uranium detection limit

    - the detection limit will be ≤10% of the WAC limit (e.g., ≤103 mg/kg for total uranium).

- If delineation data are also to be used for certification, the data must meet the data quality objectives specified in the Certification DQO (SL-043).

- Validation will include field validation of field packages for ASL B or ASL D data.

All data will undergo an evaluation by the Project Team, including a comparison for consistency with historical data. Deviations from QC considerations resulting from evaluating inputs to the decision from Section 3, must be justified in the PSP such that the objectives of the decision rule in Section 5 are met.

7.4 Independent Assessment

Independent assessment shall be performed by the FEMP QA organization by conducting surveillances. Surveillances will be planned and documented in accordance with Section 12.3 of the SCQ.

7.5 Data Management

Upon receipt from the laboratory, all results will be entered into the SED as qualified data using standard data entry protocol. The required ASL B, D or E data will undergo analytical validation by the FEMP validation team, as required (see Section 7.3). The Project Manager will be responsible to determine data usability as it pertains to supporting the DQO decision of determining delineation of media

COC's.

7.6 Applicable Procedures

Sample collection will be described in the PSP with a listing of applicable procedures. Typical related plans and procedures are the following:

- Sitewide Excavation Plan (SEP)
- Sitewide CERCLA Quality Assurance Project Plan (SCQ).
- SMPL-01, *Solids Sampling*
- SMPL-02, *Liquids and Sludge Sampling*
- SMPL-21, *Collection of Field Quality Control Samples*
- EQT-06, *Geoprobe® Model 5400 Operation and Maintenance*
- EQT-23, *Operation of High Purity Germanium Detectors*
- EQT-30, *Operation of Radiation Tracking Vehicle Sodium Iodide Detection System*

Data Quality Objectives
Delineating the Extent of Constituents of Concern During Remediation Sampling

1A. Task/Description: Delineating the extent of contamination above the FRLs

1.B. Project Phase: (Put an X in the appropriate selection.)

RI ☐ FS ☐ RD ☒ RA ☐ RvA ☐ OTHER ☐

1.C. DQO No.: SL-048, Rev. 5 DQO Reference No.: ____________

---

2. Media Characterization: (Put an X in the appropriate selection.)

Air ☐ Biological ☐ Groundwater ☒ Sediment ☒ Soil ☒

Waste ☒ Wastewater ☐ Surface water ☐ Other (specify) _____

---

3. Data Use with Analytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable Data Use.)

Site Characterization
A ☐ B ☒ C ☐ D ☒ E ☒

Risk Assessment
A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives
A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design
A ☐ B ☒ C ☐ D ☒ E ☒

Monitoring during remediation
A ☒ B ☒ C ☐ D ☒ E ☒

Other
A ☐ B ☐ C ☐ D ☐ E ☐

4.A. Drivers: Remedial Action Work Plans, Applicable or Relevant and Appropriate Requirements (ARARs) and the OU2 and/or OU5 Record of Decision (ROD).

4.B. Objective: Delineate the extent of media contaminated with a COC (or COCs) with respect to the action level(s) of interest.

---

5. Site Information (Description):

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

1. pH	[X] *	2. Uranium	[X] *	3. BTX	[ ]
Temperature	[X] *	Full Radiological	[X] *	TPH	[ ]
Specific Conductance	[X] *	Metals	[X] *	Oil/Grease	[ ]
Dissolved Oxygen	[X] *	Cyanide	[ ]		
Technetium-99	[X] *	Silica	[ ]		

4. Cations	[ ]	5. VOA	[X] *	6. Other (specify)
Anions	[ ]	BNA	[X] *	
TOC	[ ]	Pesticides	[X] *	
TCLP	[X] *	PCB	[X] *	
CEC	[ ]	COD	[ ]	

*If constituent is identified for delineation in the individual PSP.

6.B. Equipment Selection and SCQ Reference:

Equipment Selection	Refer to SCQ Section
ASL A ______	SCQ Section: ______
ASL B X	SCQ Section: App. G Tables G-1&G-3
ASL C ______	SCQ Section: ______
ASL D X	SCQ Section: App. G Tables G-1&G-3
ASL E X (See sect. 7.3, pg. 6)	SCQ Section: App. G Tables G-1&G-3

7.A. Sampling Methods: (Put an X in the appropriate selection.)

Biased	[X]	Composite	[ ]	Environmental	[X]	Grab	[X]	Grid	[X]
Intrusive	[X]	Non-Intrusive	[ ]	Phased	[ ]	Source	[ ]		

DQO Number: SL-048, Rev. 5

7.B. Sample Work Plan Reference: This DQO is being written prior to the PSPs.

Background samples: OU5 RI

7.C. Sample Collection Reference:

Sample Collection Reference: SMPL-01, SMPL-02, EQT-06

---

8. Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A. Field Quality Control Samples:

Trip Blanks	[X]*	Container Blanks	[X]++
Field Blanks	[X]+	Duplicate Samples	[X]***
Equipment Rinsate Samples	[X]***	Split Samples	[X]**
Preservative Blanks	[ ]	Performance Evaluation Samples	[ ]
Other (specify)			

*	For volatile organics only
**	Split samples will be collected where required by EPA or OEPA.
***	If specified in PSP.
+	Collected at the discretion of the Project Manager (if warranted by field conditions)
++	One per Area and Phase Area per container type (i.e. stainless steel core liner/plastic core liner/Geoprobe tube).

8.B. Laboratory Quality Control Samples:

Method Blank	[X]	Matrix Duplicate/Replicate	[X]
Matrix Spike	[X]	Surrogate Spikes	[ ]
Tracer Spike	[ ]		

Other (specify) Per SCQ

9. Other: Please provide any other germane information that may impact the data quality or gathering of this particular objective, task or data use.